

*IN THE UNITED STATES PATENT AND TRADEMARK OFFICE*

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In re Patent Application of:  
NEOH, et al.

Application No.: 09/895,153

Confirmation No.: 9536

Filed: July 2, 2001

Art Unit: 1762

For: PHOTOINDUCED CONVERSION OF  
POLYANILINE FROM AN INSULATING  
STATE TO A CONDUCTING STATE

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Examiner: Elena TSOY

**REPLY BRIEF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This refers to the Examiner's Answer dated June 7, 2007. It is noted that this latest Examiner's Answer purports to be "in response to the appeal brief filed June 6, 2006." A previous Examiner's Answer – mailed August 1, 2006 – had already responded to the Appeal Brief of June 6, 2006. A Reply Brief was filed on September 26, 2006. The Appeal was returned from the Board of Appeals to the Examiner on November 22, 2006. A 'Notification of Non-Compliant Appeal Brief' was issued on December 6, 2006. A conforming Appeal Brief was filed on December 29, 2006. An Examiner's Answer was mailed on April 5, 2007. A Reply Brief was filed on June 5, 2007. This latest Examiner's Answer is dated June 7, 2007. This second Examiner's Answer is procedurally improper. Appellants respectfully request that the Appeal be forwarded to the Board of Appeals for decision on its merits forthwith.

The sole claim on appeal recites four steps, as follows: a) providing a vinyl benzyl halide grafted film substrate; b) reacting the vinyl benzyl halide grafted film with an equimolar mixture of 4,4' bipyridine and p-xylene dihalide to form a viologen salt-grafted film; c) coating the

viologen salt-grafted film with polyaniline to form a polyaniline-coated film; and d) exposing the polyaniline-coated film to near-ultraviolet radiation to obtain an electrically conductive polymer.

In the paragraph bridging pages 4-5 of the latest Examiner's Answer, the Examiner summarizes the teachings of the primary reference, Sato, as follows:

Sato et al *fails to teach* that (i) chloromethylated polystyrene (i.e. a polymer having a polyethylene backbone and pendant benzyl chloride groups) can be obtained not only by chloromethylating a phenyl-containing polystyrene but also by grafting vinyl benzyl chloride onto non-phenyl-containing polymer such as polyethylene;

(ii) a) [Sato et al *fails to teach* that] the first viologen polymer film is formed by reacting a 4,4' bipyridyl monoaralkyl halide compound with a chloromethylated polymer film substrate; and

b) [Sato et al *fails to teach* that] an equimolar mixture of 4,4'-bipyridine and p-xylene dihalide is used instead of the 4,4' bipyridyl monoaralkyl halide compound;

(iii) [Sato et al *fails to teach* that] instead of polyvinyl alcohol, polyaniline can be used as electron donor for coating the viologen salt layer.

Examiner's Answer, paragraph bridging pages 4-5 (emphasis supplied). Thus, for Appellants' four-step process, the Examiner identifies four different features that Sato *fails to teach*.

As pointed out in detail in Appellants' principal Brief, almost every feature of the Sato composition is changed to obtain the present invention. It is unrealistic to contend that a person of ordinary skill in the art, starting from the Sato disclosure, would have located the Pohl, Williams, and Beratan teachings and then modified the Sato technology as proposed by the Examiner *in the absence of Appellants' guidance*. In their decision in *In re Kotzab*, 217 F.3d 1365, 55 USPQ2d 1313, (Fed. Cir. 2000), that court held that "particular findings must be made as to the reason the skilled artisan, *with no knowledge of the claimed invention*, would have selected these components [of the claims] for combination in the manner claimed." *Kotzab*, 217 F.3d at 1371, 55 USPQ2d at 1317 (emphasis supplied).

In the present case, claim 36 is rejected over different elements selected from within a panoply of references. In *Kotzab*, claims were rejected over different items selected from within a single reference. The court said that the PTO had fallen into "the hindsight trap" and located within the reference statements that conjecturally could be put together to suggest the claimed invention. But, the court pointed out, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no

knowledge of Kotzab's invention to make the combination in the manner claimed. The Court held that the PTO had not made out a proper *prima facie* case of obviousness. Similarly, in the present situation – where the rejection is permeated with improper hindsight – the Examiner has failed to make out a sustainable *prima facie* case of obviousness based upon her selection from the various references assembled to reject Appellants' claim.

At the bottom of page 5 of the latest Examiner's Answer, the Examiner contends that by reacting a 4,4'-bipyridyl monoaralkyl halide with a benzyl chloride grafted polymer in the presence of a substrate "at least some" of the benzyl grafted polymer would be deposited as a film on the substrate, thereby forming a benzyl chloride grafted film substrate. The Examiner contends further that the 4,4'-bipyridyl monoaralkyl halide compound would react with the benzyl chloride grafted film substrate (allegedly as required by claim 36). What the Examiner is proposing here is a physical coating of benzyl chloride-grafted polymer on a substrate. This is very different from the technology of claim 36, in which vinyl benzyl halide units are grafted (chemically attached) to the substrate.

At the bottom of page 7 of the latest Examiner's Answer, the Examiner contends that "Williams teach that viologen salt polymer is electron permeable and charge carrying and can be applied on electrode, i.e. electroconductive." This inaccurate summation of the teachings of the Williams reference is apparently based upon the Examiner's discussion of Williams at the middle of page 5 of the Examiner's Answer:

Williams et al teach that a film of a viologen polymer can be formed by reacting 4,4'-bipyridyl with benzyl halide groups of chloromethylated polymer (See column 8, lines 1-27) or with an equimolar amount of an organic dihalide at temperatures from about 20°C to 60°C (See column 6, line 36-59) either in the presence of a substrate or the preformed viologen polymer can be cast, coated or laminated to the surface on the substrate (See column 7, lines 1-3). Williams et al teach that the resulting viologen polymer (See column 6, lines 3, 9-10) is electron permeable and charge carrying (See column 6, lines 9-11) and can be used for photoelectrochemical electrodes (See column 1, lines 13-15).

That disclosure of Williams – that the "viologen polymer ... can be used for photoelectrochemical electrodes" – does not state or suggest that a viologen salt polymer "can be applied on an electrode." Column 1, lines 13-15 of Williams teach only that his invention

“relates to ... electrodes coated with a layer of catalyst particles dispersed in an ionic polymer.” Accordingly, Appellants controvert the assertion at the bottom of page 7 of the Examiner’s Answer that “Williams teach that viologen salt polymer is electron permeable and charge carrying and can be applied on electrode, i.e. electroconductive.”

At the top of page 8 of the latest Examiner’s Answer, the Examiner contends that Figure 4b of Beratan shows that the methyl viologen acceptor is covalently attached to a film substrate having grafted benzyl groups. The Examiner admits that Beratan does not disclose how the covalent attachment is accomplished, and the Examiner assumes that customary methods were used. The square bracket of Figure 4b does not imply attachment to a substrate. Instead it implies a repeating monomeric unit. Beratan states that his polymer 22 comprises a plurality of monomeric units (col. 4, line 25) and that each unit comprises at least 3 different monomers, the donor, the intermediate, and the acceptors (col. 2, line 14). Furthermore, the attachment of the polymer 22 to an electrode is described, in lines 38-41 of column 7, as being via “a deposition using directional shadowing, and then using the activated area as an electrode to form a covalent bond with a group such as a silyl at the head end of the polymer chain”. In this case, the polymer is first formed (typically 600 polymer units long – col. 7, line 35) and then attached to the substrate via groups such as silyl. In contrast, in claim 36 the vinyl benzyl halide units are first grafted and then the viologen polymer is grown from these units via the reaction of 4,4’-bipyridine and p-xylene dihalide.

On page 11 of the Examiner’s Answer, the Examiner argues that “a polymeric material of Sato et al in view of Williams et al in view of Beratan et al [is] ***a composition actually disclosed in the prior art***”. (Emphasis in original.) Query: what about Pohl? Appellants recognize that Sato discloses certain compositions in JP 56-26977 and Williams discloses other compositions in US 4,414,080 and Beratan discloses yet other compositions in US 5,016,063. In what document do Sato and Williams and Beratan disclose a polymeric material of the present invention?

In her discussion of inherency on page 11 of the Examiner’s Answer, the Examiner cites sections 2111.02 and 2112.01 of the Manual of Patent Examining Procedure (MPEP). It is not clear why she cites MPEP 2111.02, which is entitled “Effect of Preamble”. MPEP 2112.01 does discuss inherency, but the context of the discussion indicates that inherency is a consideration

where a claim is rejected over a single reference, ***not over a combination of references***. To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949 (Fed. Cir. 1999). See also *Transclean Corp. v. Bridgewood Serv. Inc.*, 290 F.3d 1346, 62 USPQ2d 1865 (Fed. Cir. 2002). Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing ***may*** result from a given set of circumstances is ***not*** sufficient. *Scaltech Inc. v. Retec/Tetra L.L.C.*, 156 F.3d 1193, 51 USPQ2d 1055 (Fed. Cir. 1999).

In their principal Brief, Appellants had pointed out that electron transfer, to which the Examiner has referred, is the mechanism of an oxidation-reduction reaction, and that electron transfer does not imply conduction – that is, movement of electrons through a material under the influence of a voltage gradient. Appellants provided evidentiary publications by Kamogawa et al., Sampanthar et al., and Ogawa et al. in support of this clarification of technology. The Examiner fails to give any detailed consideration to the evidence proffered by Appellants. The Examiner continues to maintain, on page 11 of the Examiner's Answer, that it does not matter whether she is right or wrong with respect to whether electron transfer is the same as electroconductivity. ***To the contrary, the invention lies in achieving the latter rather than the former.*** The Examiner is wrong. Accordingly, the Board should adopt Appellants' position that the references assembled by the Examiner make no suggestion of irradiating an article comprising polyaniline and viologen to obtain a conductive material.

In sum, the Examiner's Answer relates to two deficiencies in the cite references and attendant failure of the combined papers to establish *prima facie* obviousness. First, the references do not describe or suggest *in situ* growth of the conductive polymeric material from pendant groups on a substrate. Second, the references do not describe a conductive polymer. The Examiner's arguments on these two points either miss them completely, as in the first instance, or are simply unconvincing, as in the second.

For at least the reasons explained in the Brief on Appeal filed in this application on December 29, 2006, the combination of Sato JP '977, Pohl '233, Williams et al. '080, and Beratan '063 fails to place the subject matter of claim 36 in the possession of persons of ordinary

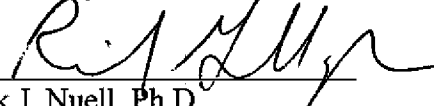
skill in the art. Accordingly, the rejection of claim 36 under 35 U.S.C. § 103(a) over these references is improper and should be reversed.

If there are any questions concerning this application, the Examiner and/or the Board is/are respectfully requested to contact Richard Gallagher (Reg. No. 28,781) at (703) 205-8008.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: August 6, 2007

Respectfully submitted,

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